

Acanthocephala, Annelida, Arthropoda, Myxozoa, Nematoda and Platyhelminthes parasites of fishes from the Guandu river, Rio de Janeiro, Brazil

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ABSTRACT: Using information from all published reports and data collected during several parasitological surveys between April 2003 and September 2009, a checklist of the parasites of fishes from Guandu River, southeastern of Brazil was generated. A total of 85 parasite species, 54 named species (1 Acanthocephala, 1 Cestoda, 2 Crustacea, 13 Digenea, 11 Nematoda, 23 Monogenea and 3 Myxozoa) and 31 undetermined species (3 Acanthocephala, 2 Cestoda, 1 Crustacea, 8 Digenea, 8 Nematoda, 4 Hirudinea, 3 Monogenea and 2 Myxozoa) in 21 fish host species from Guandu River, were listed in the current study, including 36 new locality records and 36 new host records. Also, a host-parasite list is included herein.

Introduction

Brazil is the fifth largest country in the world and has the highest species diversity of all of the megadiversity countries, accounting for roughly 14 % of the world's biota (Muniz-Pereira *et al.* 2009). Parasites are recognized as an important component of global biodiversity (Poulin and Morand 2004). Given the integral roles played by parasites in natural ecosystems, identifying hotspots of high parasite diversity, as well as areas of relatively low parasite diversity, is crucial for a complete understanding of the functioning of the biosphere (Luque and Poulin 2007). Currently, the biodiversity of freshwater ecosystems of Latin America is threatened, mainly by environmental problems resulting from the degradation of the ecosystems. In this context, parasite biodiversity can be very important because parasitism plays key roles in ecosystems, regulating the abundance or density of host populations, stabilize food webs and structuring animal communities. Thus, a good knowledge of parasite diversity and whether or not it is declining is crucial for environmental management and conservation (Luque and Poulin 2007). Here we provide a checklist of the parasites species associated with fishes from Guandu River (Figure 1) in function of the strategic importance of this River, which is the main source of potable water in Rio de Janeiro. The information is presented as a list of parasite species and as a host-parasite list.

Materials and methods

The elaboration of the checklist of the species of parasites reported from fishes from Guandu river, was based on information collected from two sources. Firstly, using published records and papers derived of literature. Secondly, through the sampling between April 2003 to September 2009 where were analyzed 786 specimens of fish, belonging to 21 species from the Guandu River (Table 1), near the dam of water treatment station (WTS) (22°48'2" S, 43°37'35" W), and captured by local fishermen. The checklist follows the classification and systematic

arrangements of the following studies: Amin (1987) for Acanthocephala; Khalil *et al.* (1994) for Cestoda; Boxshall and Halsey (2004) for Crustacea; Kohn *et al.* (2007) for Digenea; Davies (1991) for Hirudinea; Boeger and Vianna (2006) for Monogenea and Moravec (1998) for Nematoda. The parasites are arranged according to the class, order and family, within which the species are presented in alphabetical order. Parasite species names follow those provided in the most recent taxonomic literature. Species of fishes are arranged in alphabetical sequence and valid names are adopted from FishBase (Froese and Pauly 2009). The following conventions in relation to the parasite records were observed: NHR refers to a new host record and NGR refers to Guandu River as new geographical

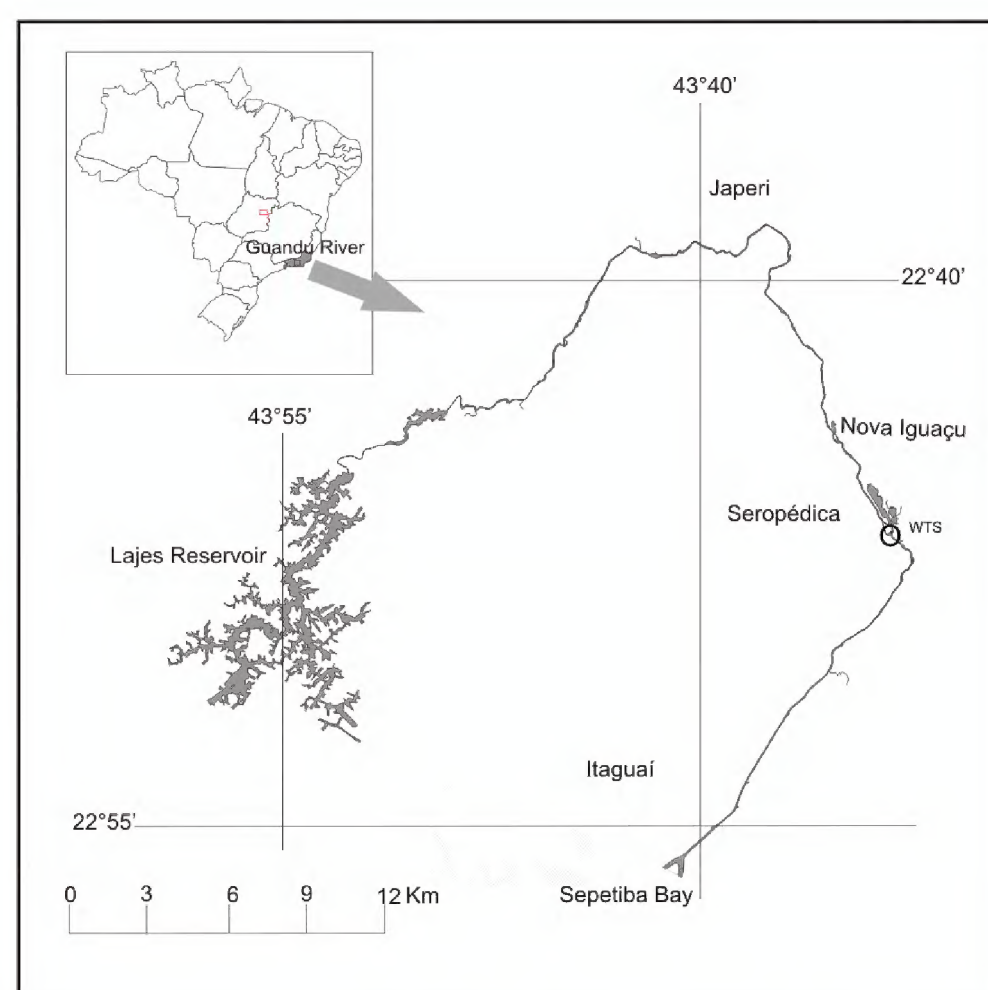


FIGURE 1. Map of the Guandu river and the area of collection (circle) near to the dam of water treatment station (WTS) (22°48'32" S, 43°37'35" W)

record. Voucher specimens of parasites species were deposited in the Coleção Helminológica do Instituto de Biociências de Botucatu (CHIBB), Universidade Estadual Paulista, State of São Paulo, Brazil.

Results and Discussion

A total of 54 named species of parasites (1 Acanthocephala, 1 Cestoda, 2 Crustacea, 13 Digenea, 11 Nematoda, 23 Monogenea and 3 Myxozoa) and 31 undetermined species of parasites (3 Acanthocephala, 2 Cestoda, 1 Crustacea, 8 Digenea, 8 Nematoda, 4 Hirudinea, 3 Monogenea and 2 Myxozoa) (Figure 2) in 21 host species (2 Anostomidae, 2 Auchenipteridae, 1 Callichthyidae, 1 Centropomidae, 4 Characidae, 4 Cichlidae, 1 Curimatidae, 1 Gymnotidae, 1 Heptapteridae, 2 Loricariidae, 1 Mugilidae and 2 Pimelodidae) from Guandu River were listed in the current study, including 36 new locality records and 36 new host records.

TABLE 1. Host species studied for parasites from Guandu River, State of Rio de Janeiro, Brazil, between April 2003 and September 2009.

HOSTS	COMMON NAME	N TOTAL
ANOSTOMIDAE		
<i>Leporinus conirostris</i> Steindachner, 1875	piau	18
<i>Leporinus copelandii</i> Steindachner, 1875	piau	30
AUCHENIPTERIDAE		
<i>Glanidium melanopterum</i> Miranda Ribeiro, 1918	bagre	10
<i>Trachelyopterus striatulus</i> (Steindachner, 1877)	cumbaca	60
CALLICHTHYIDAE		
<i>Hoplosternum littorale</i> (Hancock, 1828)	tamboatá	100
CENTROPOMIDAE		
<i>Centropomus undecimalis</i> (Bloch, 1792)	robalo	31
CHARACIDAE		
<i>Astyanax bimaculatus</i> (Linnaeus 1758)	lambari-amarelo	40
<i>Astyanax paraguayae</i> Eigenmann, 1908	lambari-vermelho	40
<i>Mylossoma aureum</i> (Spix and Agassiz, 1829)	pacu	17
<i>Oligosarcus hepsetus</i> (Cuvier, 1829)	bocarra	40
CICHLIDAE		
<i>Astronotus ocellatus</i> (Agassiz, 1831)	apaiari	35
<i>Cichla ocellaris</i> Bloch and Schneider, 1801	tucunaré	26
<i>Geophagus brasiliensis</i> (Quoy and Gaimard, 1824)	acará	50
<i>Tilapia rendalii</i> (Boulenger, 1897)	tilápia	30
CURIMATIDAE		
<i>Cyphocharax gilbert</i> (Quoy and Gaimard, 1824)	sairú	60
GYMNOTIDAE		
<i>Gymnotus carapo</i> Linnaeus, 1758	peixe-banana	30
HEPTAPTERIDAE		
<i>Rhamdia quelen</i> (Quoy and Gaimard, 1824)	bagre	32
LORICARIIDAE		
<i>Hypostomus affinis</i> (Steindachner, 1877)	casquito	31
<i>Loricariichthys castaneus</i> (Castelnau, 1855)	casquito-viola	32
MUGILIDAE		
<i>Mugil liza</i> Valenciennes, 1836	tainha	34
PIMELODIDAE		
<i>Pimelodus maculatus</i> Lacépède, 1803	mandi-amarelo	40
TOTAL		786

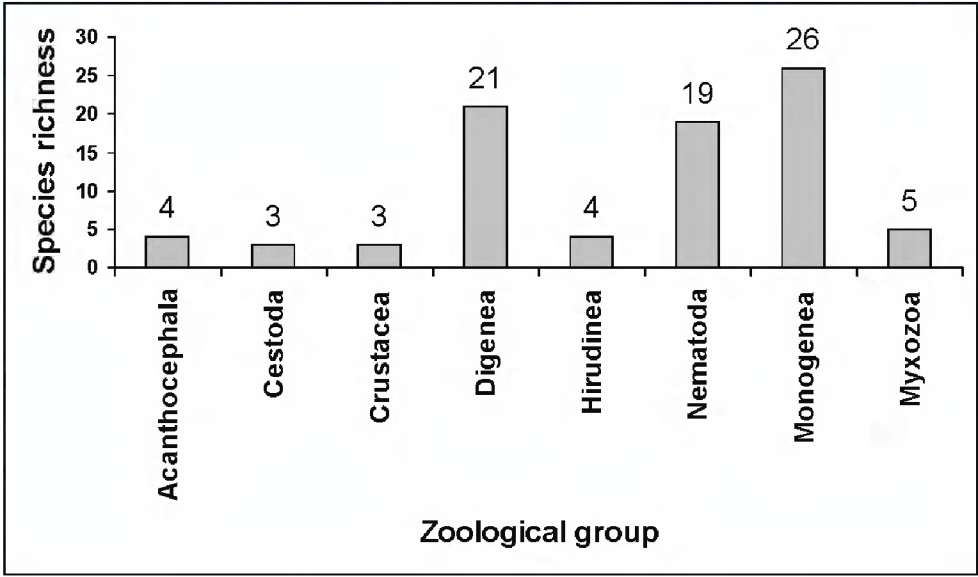


FIGURE 2. Species richness (number of species) of fish parasites according to zoological groups recorded in the Guandu river, State of Rio de Janeiro, Brazil.

ACANTHOCEPHALA Rudolphi, 1808

EOACANTHOCEPHALA Van Cleave, 1936

NEOECHINORHYNCHIDA Southwell and MacFie, 1925

Neoechinorhynchidae Ward, 1917

Neoechinorhynchus paraguayensis Machado Filho, 1959
Host: *Geophagus brasiliensis* (Quoy and Gaimard, 1824)
References: Nickol and Padilha (1979), Azevedo *et al.* (2006), Carvalho *et al.* (2010)

Neoechinorhynchus sp.
Host: *Gymnotus carapo* Linnaeus, 1758 (NHR)
Specimen deposited: CHIBB 012L
Reference: Present paper

PALAEACANTHOCEPHALA Meyer, 1931

POLYMORPHIDA Petrochenko 1956

Polymorphidae Meyer, 1931

Andracantha sp. — cystacanth
Hosts: *Centropomus undecimalis* (Bloch, 1792) (NHR, NGR)
Specimen deposited: CHIBB 014L
Reference: Present paper

Polymorphus sp.— cystacanth
Hosts: *Astronotus ocellatus* (Agassiz, 1831), *Geophagus brasiliensis*, *Gymnotus carapo* (NHR), *Oligosarcus hepsetus* (Cuvier, 1829), *Rhamdia quelen* (Quoy and Gaimard, 1824)
Specimens deposited: CHIBB 013L, 023L
References: Abdallah *et al.* (2004), Azevedo *et al.* (2006 ; 2007), present paper

ANNELIDA Lamarck, 1809

HIRUDINEA Lamarck, 1818

RHYNCHOBDELLIDA Blanchard, 1894

Glossiphoniidae Vaillant, 1890

Glossiphoniidae gen. sp.

Host: *Geophagus brasiliensis*, *Gymnotus carapo*, *Hoplosternum littorale* (Hankoc, 1828)

References: Abdallah *et al.* (2006), Azevedo *et al.* (2006), Carvalho *et al.* (2010), present paper

Helobdella sp.

Host: *Pimelodus maculatus* Lacépède, 1803, *Loricariichthys castaneus* (Castelnau, 1855) (NHR), *Trachelyopterus striatulus* (Steindachner, 1877)

Specimens deposited: CHIBB 015L, 021L, 022L

References: Santos *et al.* (2007), Mesquita *et al.* (2010), present paper

Placobdella sp.

Hosts: *Astronotus ocellatus*, *Cyphocharax gilbert* (Quoy and Gaimard, 1824), *Geophagus brasiliensis*, *Hoplosternum littorale*, *Hypostomus affinis* (Steindachner, 1877)

Specimen deposited: CHIBB 016L

References: Abdallah *et al.* (2005; 2006), Azevedo *et al.* (2006, 2007), present paper

Piscicolidae

Piscicolidae gen. sp.

Host: *Centropomus undecimalis*, *Geophagus brasiliensis*, *Rhamdia quelen*

References: Carvalho *et al.* (2010), present paper

ARTHROPODA Latreille, 1829

MAXILLOPODA Dahl, 1956

CYCLOPOIDA Burmeister, 1834

Ergasilidae Von Nordmann, 1832

Ergasilus sp.

Host: *Mugil liza* Valenciennes, 1836 (NGR)

Specimen deposited: CHIBB 5014

Reference: Present paper

Lernaeidae Cobbold, 1879

Lamproglena monodi Capart, 1944

Hosts: *Astronotus ocellatus* (NHR, NGR), *Cichla ocellaris* Bloch and Schneider, 1801 (NHR), *Tilapia rendalii* (Boulenger, 1897)

Specimens deposited: CHIBB 5016, 5017

Reference: Present paper

SIPHONOSTOMATOIDA THORELL, 1859

Lernaeopodidae Milne Edwards, 1840

Naobranchia lizae (Kroyer, 1863)

Host: *Mugil liza* (NHR, NGR)

Specimen deposited: CHIBB 5015

Reference: Present paper

MYXOZOA Grasse, 1960

MYXOSPOREA Bütschli, 1881

BIVALVULIDA Schulman, 1959

Myxobolidae Thélohan, 1892

Henneguya cyphocharax Abdallah, Azevedo and Luque, 2007

Host: *Cyphocharax gilbert*

References: Abdallah *et al.* (2007)

Henneguya guanduensis Abdallah, Azevedo and Luque, 2007

Host: *Hoplosternum littorale*

References: Abdallah *et al.* (2007)

Henneguya sp.

Host: *Astyanax bimaculatus* (Linnaeus, 1758), *A. parahybae* Eigenmann, 1908 (NHR), *Leporinus conirostris* Steindachner, 1875 (NHR), *L. copelandii* Steindachner, 1875, *Oligosarcus hepsetus* (NHR)

Specimens deposited: CHIBB 009L

References: Santos *et al.* (2007), present paper

Myxobolus absonus Cellere, Cordeiro and Adriano, 2002

Host: *Pimelodus maculatus*

Reference: Santos *et al.* (2007)

Myxobolus sp.

Host: *Centropomus undecimalis*, *Mugil liza*

Specimens deposited: CHIBB 008L, 010L

Reference: Present paper

NEMATODA Rudolphi, 1808

ADENOPHOREA Linstow, 1905

ENOPLIDA Schuurmans, Stekhoven and Deconing, 1933

Capillariidae Railliet, 1915

Capillariidae gen. sp.

Hosts: *Gymnotus carapo*, *Hoplosternum littorale*, *Rhamdia quelen*

Reference: Abdallah *et al.* (2006), present paper

Paracapillaria piscicola (Travassos, Artigas and Pereira 1928)

Hosts: *Hypostomus affinis* (NHR, NGR), *Trachelyopterus striatulus*

Specimens deposited: CHIBB 4996, 4998

Reference: Mesquita *et al.* (2010), present paper

SECERNENTEA Linstow, 1905

ASCARIDIDA Skrjabin and Shulz, 1940

Anisakidae Skrjabin and Karoklin, 1945

Contracaecum sp.-larval

Hosts: *Astronotus ocellatus*, *Centropomus undecimalis*, *Geophagus brasiliensis*, *Gymnotus carapo*, *Loricariichthys castaneus* (NHR), *Rhamdia quelen*, *Trachelyopterus striatulus*

Specimens deposited: CHIBB 5010, 5011

Reference: Azevedo *et al.* (2006; 2007), Carvalho *et al.* (2010), Mesquita *et al.* (2010), present paper

Goezia sp.

Host: *Hoplosternum littorale*

Reference: Abdallah *et al.* (2006)

Hysterothylacium sp. -larval

Hosts: *Mugil liza* (NHR, NGR), *Trachelyopterus striatulus*

Specimens deposited: CHIBB 5012, 5013

Reference: Mesquita *et al.* (2010), present paper

Raphidascaris sp. -larval

Host: *Cyphocharax gilbert*

References: Abdallah *et al.* (2005)

Cucullanidae Cobbod, 1864

Cucullanus (*Cucullanus*) *brevispiculus* Moravec, Kohn and Fernandes, 1993

Host: *Leporinus copelandii* (NHR, NGR)

Specimen deposited: CHIBB 5007

Reference: Present paper

Cucullanus (*Cucullanus*) *grandistomis* (Ferraz and Thatcher 1988) Moravec, Kohn and Fernandes, 1993

Host: *Mugil liza* (NHR, NGR)

Specimen deposited: CHIBB 5003

Reference: Present paper

Cucullanus (*Cucullanus*) *pinnai pinnai* Travassos, Artigas and Pereira, 1928

Host: *Pimelodus maculatus*

Specimen deposited: CHIBB 5004

References: Santos *et al.* (2007), Albuquerque *et al.* (2008), present paper

Cucullanus sp.

Host: *Geophagus brasiliensis*, *Rhamdia quelen* (NHR), *Trachelyopterus striatulus*

Specimen deposited: CHIBB 4997

Reference: Carvalho *et al.* (2010), Mesquita *et al.* (2010), present paper

OXYURIDA Railliet, 1916

Pharyngodonidae Travassos, 1919

Cosmoxynemoides aguirrei Travassos, 1949

Hosts: *Cyphocharax gilbert*

References: Abdallah *et al.* (2005)

Spinoxyuris annulata Moravec and Thatcher, 2001

Host: *Mylossoma aureum* (Spix and Agassiz, 1829) (NHR, NGR)

Specimens deposited: CHIBB 5002

Reference: Present paper

Travnema araujoii Fernandes, Campos and Artigas, 1983

Host: *Cyphocharax gilbert*

References: Abdallah *et al.* (2005)

SPIRURIDA Chitwood, 1933

Camallanidae Railliet and Henry, 1915

Procamallanus (*Procamallanus*) *peraccuratus* Pinto, Fábio, Noronha and Rolas, 1976

Hosts: *Cichla ocellaris* (NHR, NGR), *Geophagus brasiliensis*, *Gymnotus carapo* (NHR), *Trachelyopterus striatulus*

Specimens deposited: CHIBB 4999, 5000, 5006

Reference: Carvalho *et al.* (2010), Mesquita *et al.* (2010), present paper

Procamallanus sp.

Hosts: *Pimelodus maculatus*

Reference: Santos *et al.* (2007)

Procamallanus (*Spirocamallanus*) *hilarii* Vaz and Pereira, 1934

Hosts: *Astyanax bimaculatus*, *A. parahybae*

References: Abdallah *et al.* (2004)

Procamallanus (*Spirocamallanus*) *inopinatus* Travassos, Artigas and Pereira, 1928

Host: *Leporinus copelandii* (NGR)

Specimen deposited: CHIBB 5008

Reference: Present paper

Rhabdochonidae Travassos, Artigas and Pereira, 1928

Rhabdochona sp.

Host: *Centropomus undecimalis* (NHR, NGR)

Specimens deposited: CHIBB 5009

Reference: Present paper

Rhabdochona uruyeni Diaz-Ungría 1968

Host: *Pimelodus maculatus* (NHR, NGR)

Specimen deposited: CHIBB 5001

Reference: Present paper

PLATYHELMINTHES Gegenbaur, 1859

CESTODA Van Beneden, 1849

PROTEOCEPHALIDEA Mola, 1928

Proteocephalidae La Rue, 1914

Nomimoscolex sp.

Host: *Pimelodus maculatus*

Specimen deposited: CHIBB 024L

References: Santos *et al.* (2007), Albuquerque *et al.* (2008), present paper

Proteocephalus macrophallus (Diesing 1850)

Host: *Cichla ocellaris* (NGR)

Specimen deposited: CHIBB 025L

Reference: Present paper

Proteocephalus sp.

Host: *Gymnotus carapo* (NGR)

Specimen deposited: CHIBB 026L
Reference: Present paper

MONOGENEA van Beneden, 1858

DACTYLOGYRIDEA Bychowsky, 1937

Dactylogyridae Bychowsky, 1933

Anacanthorus paraspithulatus Kritsky, Boeger and van Every, 1992
Host: *Mylossoma aureum* (NHR, NGR)
Specimen deposited: CHIBB 027L
References: Present paper

Aphanoblastella mastigatus Suriano 1986
Host: *Rhamdia quelen* (NGR)
Specimen deposited: CHIBB 028L
References: Present paper

Demidospermus armostus Kritsky and Gutiérrez, 1998
Host: *Pimelodus maculatus* (NGR)
Specimen deposited: CHIBB 017L
References: Present paper

Demidospermus leptosynophallus Kritsky and Gutierrez, 1998
Host: *Pimelodus maculatus* (NHR, NGR)
Specimen deposited: CHIBB 019L
References: Present paper

Demidospermus majusculus Kritsky and Gutierrez, 1998
Host: *Pimelodus maculatus*
Reference: Santos *et al.* (2007)
Demidospermus paravalenciennesi Gutiérrez and Suriano, 1992
Host: *Pimelodus maculatus*
Specimen deposited: CHIBB 018L
References: Santos *et al.* (2007), present paper

Demidospermus sp.
Host: *Loricariichthys castaneus* (NHR)
Specimen deposited: CHIBB 029L
References: Present paper

Demidospermus uncusvalidus Gutiérrez and Suriano, 1992
Host: *Pimelodus maculatus*
Reference: Santos *et al.* (2007)

Gussevia asota Kritsky, Thatcher and Boeger, 1989
Host: *Astronotus ocellatus*
References: Azevedo *et al.* (2007), Abdallah *et al.* (2008)

Gussevia astronoti Kritsky, Thatcher and Boeger, 1989
Host: *Astronotus ocellatus*
References: Azevedo *et al.* (2007), Abdallah *et al.* (2008)

Gussevia tucunarensis Kritsky, Thatcher and Boeger, 1986

Host: *Cichla ocellaris* (NGR)
Specimen deposited: CHIBB 030L
References: Present paper

Gussevia undulata Kritsky, Thatcher and Boeger, 1986
Host: *Cichla ocellaris* (NGR)
Specimen deposited: CHIBB 020L
References: Present paper

Ligophorus brasiliensis Abdallah, Azevedo and Luque, 2009
Host: *Mugil liza*
References: Abdallah *et al.* (2009)

Ligophorus guanduensis Abdallah, Azevedo and Luque, 2009
Host: *Mugil liza*
References: Abdallah *et al.* (2009)

Ligophorus lizae Abdallah, Azevedo and Luque, 2009
Host: *Mugil liza*
References: Abdallah *et al.* (2009)

Ligophorus tainhae Abdallah, Azevedo and Luque, 2009
Host: *Mugil liza*
References: Abdallah *et al.* (2009)

Sciadicleithrum ergensi Kritsky, Thatcher and Boeger, 1989
Host: *Cichla ocellaris* (NGR)
Specimen deposited: CHIBB 031L
References: Present paper

Sciadicleithrum guanduensis Carvalho, Tavares and Luque, 2008
Host: *Geophagus brasiliensis*
Reference: Carvalho *et al.* (2008), (2010a)

Trinigyryus hypostomatis Hanek, Molnar and Fernando, 1974
Host: *Hypostomus affinis* (NHR, NGR)
Specimen deposited: CHIBB 032L
References: Present paper

Diplectanidae Monticelli, 1903

Rhabdosynochus hargisi Kritsky, Boeger and Robaldo, 2001
Host: *Centropomus undecimalis* (NGR)
Specimen deposited: CHIBB 033L
References: Present paper

GYRODACTYLIDEA Bychowsky, 1937

Gyrodactylidae van Beneden and Hesse, 1863

Gyrodactylus sp.
Hosts: *Astyanax bimaculatus*, *A. parahybae* (NGR)
Specimen deposited: CHIBB 011L
References: Present paper

Hyperopletes malmbergi Boeger, Kritsky and Belmont-

Jégu, 1994

Host: *Hypostomus affinis* (NHR, NGR)

Specimen deposited: CHIBB 034L

References: Present paper

Phanerothecioides agostinhoi Kritsky, Vianna and Boeger, 2007

Host: *Hypostomus affinis* (NGR)

Specimen deposited: CHIBB 035L

References: Present paper

Scleroductus sp.

Host: *Glanidium melanopterum* Miranda Ribeiro, 1918, *Trachelyopterus striatulus*, *Pimelodus maculatus*, *Pimelodella* sp., *Rhamdia quelen*

References: Kritsky *et al.* (1995), Santos *et al.* (2007)

Scleroductus yuncensi Jará and Con,e 1989

Host: *Leporinus copelandii* (NHR, NGR)

Specimen deposited: CHIBB 036L

References: Present paper

MAZOCRAEIDEA Bychowsky 1937

Microcotylidae Taschenberg, 1879

Anakohnia brasiliiana Bravo–Hollis, 1986

Host: *Centropomus undecimalis* (NHR, NGR)

Specimen deposited: CHIBB 001L

Reference: Present paper

TREMATODA Rudolphi, 1808

DIGENEA Carus, 1863

Acanthocollaritrematidae Travassos, Freitas and Bührnheim, 1965

Acanthocollaritrema umbilicatum Travassos, Freitas and Bührnheim, 1965

Host: *Centropomus undecimalis* (NGR)

Specimen deposited: CHIBB 037L

Reference: Present paper

Allocreadiidae (Looss, 1902) Stossich, 1903

Creptotrema creptotrema Travassos, Artigas and Pereira, 1928

Host: *Leporinus conirostris* (NHR, NGR)

Specimen deposited: CHIBB 038L

Reference: Present paper

Apocreadidae Skrjabin, 1942

Crassicutis sp.

Host: *Geophagus brasiliensis*

Reference: Carvalho *et al.* (2010)

Bucephalidae Poche, 1907

Bucephalus sp.

Host: *Centropomus undecimalis* (NGR)

Specimen deposited: CHIBB 039L, 049L

Reference: Present paper

Clinostomidae Lühe, 1901

Clinostomum complanatum (Rudolphi, 1814) -metacercariae

Hosts: *Astyanax bimaculatus*, *A. parahybae*, *Gymnotus carapo*, *Hoplosternum littorale*, *Oligosarcus hepsetus*

References: Abdallah *et al.* (2004), Abdallah *et al.* (2006), present paper

Clinostomum detruncatum Braum, 1899 -metacercariae

Hosts: *Rhamdia quelen* (NGR), *Trachelyopterus striatulus*

Specimens deposited: CHIBB 046L, 047L, 048L

Reference: Mesquita *et al.* (2010), present paper

Diplostomidae Poirier, 1886

Austrodiplostomum compactum (Lutz, 1928) -metacercariae

Hosts: *Centropomus undecimalis* (NHR), *Cichla ocellaris*, *Cyphocharax gilbert*, *Geophagus brasiliensis*, *Gymnotus carapo* (NHR), *Hypostomus affinis* (NHR), *Loricariichthys castaneus*, *Pimelodus maculatus* (NHR), *Trachelyopterus striatulus*

Specimens deposited: CHIBB 007L, 040L, 041L, 042L, 043L, 044L, 045L

References: Abdallah *et al.* (2005), Azevedo *et al.* (2006), Santos *et al.* (2007), Carvalho *et al.* (2010a, b), Mesquita *et al.* (2010), present paper

Diplostomum sp. -metacercariae

Host: *Geophagus brasiliensis*, *Pimelodus maculatus*

Specimen deposited: CHIBB 006L

Reference: Carvalho *et al.* (2010a, b), present paper

Neascus tipo 1

Host: *Geophagus brasiliensis*

Reference: Carvalho *et al.* (2010a, b)

Neascus tipo 2

Host: *Geophagus brasiliensis*

Reference: Carvalho *et al.* (2010a, b)

Posthodiplostomum macrocotyle Dubois, 1937 -metacercariae

Hosts: *Geophagus brasiliensis*, *Trachelyopterus striatulus*

Specimen deposited: CHIBB 005L

References: Azevedo *et al.* (2006), Mesquita *et al.* (2010), present paper

Posthodiplostomum sp. -metacercariae

Host: *Geophagus brasiliensis*

Reference: Carvalho *et al.* (2010a, b)

Sphincterodiplostomum musculosum Dubois, 1936 -metacercariae

Host: *Cyphocharax gilbert*

References: Abdallah *et al.* (2005)

Gorgoderidae, Looss 1901

Phyllodistomum rhamdiae Amato and Amato 1993

Host: *Rhamdia quelen*

Reference: Amato and Amato (1993)

Haplospilachnidae Poche, 1926

Haplospilachnidae gen. sp.

Host: *Mugil liza*

Reference: Present paper

Haploporidae Nicoll, 1914

Saccocoelioides elongatus Szidat, 1954

Host: *Mugil liza* (NHR, NGR)

Specimen deposited: CHIBB 004L

Reference: Present paper

Heterophyidae Odhner, 1914

Ascocotyle sp.-metacercariae

Host: *Mugil liza* (NHR, NGR)

Reference: Present paper

Lecithasteridae Odhner, 1905

Hysterolecitha brasiliensis Oliveira, Amato and Knoff, 1988

Host: *Mugil liza* (NGR)

Specimen deposited: CHIBB 003L

Reference: Present paper

Macroderoididae McMullen, 1937

Magnivitellinum corvitellinum Lacerda, Takemoto and Pavanelli, 2009

Host: *Hoplosternum littorale* (NGR)

Specimen deposited: CHIBB 002L

Reference: Present paper

Proterodiplostomidae (Dubois, 1936)

Herpetodiplostomum caimanicola (Dollfus, 1935) Dubois, 1936 -metacercariae

Host: *Hoplosternum littorale*

References: Abdallah *et al.* (2006)

Zonocotylidae Yamaguti, 1963

Zonocotylodes haroltravassosi (Padilha 1978) Kohn, Fernandes, Macedo and Abramson, 1985

Host: *Cyphocharax gilbert*

References: Padilha (1978), Abdallah *et al.* (2005)

HOST-PARASITE LIST

ACTINOPTERYGII

CHARACIFORMES

Anostomidae

Leporinus conirostris

Creptotrema creptotrema

Henneguya sp.

Leporinus copelandii

Cucullanus (*Cucullanus*) *brevispiculus*

Henneguya sp.

Procamallanus (*Spirocamallanus*) *inopinatus*

Scleroductus yuncensi

Characidae

Astyanax bimaculatus

Clinostomum complanatum

Gyrodactylus sp.

Henneguya sp.

Procamallanus (*Spirocamallanus*) *hilarii*

Astyanax paraguayae

Clinostomum complanatum

Gyrodactylus sp.

Henneguya sp.

Procamallanus (*Spirocamallanus*) *hilarii*

Mylossoma aureum

Anacanthorus paraspithulatus

Spinoxyuris annulata

Oligosarcus hepsetus

Clinostomum complanatum

Henneguya sp.

Polymorphus sp.

Curimatidae

Cyphocharax gilbert

Austrodiplostomum compactum

Cosmoxynemoides aguirrei

Henneguya cyphocharax

Placobdella sp.

Raphidascaris sp.

Sphincterodiplostomum musculosum

Travnema araujo

Zonocotylodes haroltravassosi

GYMNOTIFORMES

Gymnotidae

Gymnotus carapo

Austrodiplostomum compactum

Capillariidae gen. sp.

Clinostomum complanatum

Contracaecum sp.

Glossiphoniidae gen. sp.

Neoechinorhynchus sp.

Polymorphus sp.

Procamallanus (*Procamallanus*) *peraccuratus*

Proteocephalus sp.

MUGILIFORMES

Mugilidae

Mugil liza

Ascocotyle sp.

Cucullanus (*Cucullanus*) *grandistomis*

Ergasilus sp.

Haplospilachnidae gen. sp.

Hysterolecitha brasiliensis

Hysterothylacium sp.

Ligophorus brasiliensis

Ligophorus guanduenis

Ligophorus lizae
Ligophorus tainhae
Myxobolus sp.
Naobranchia lizae
Saccocoelioides elongatus

PERCIFORMES

Centropomidae

Centropomus undecimalis
Acanthocollaritrema umbilicatum
Anakohnia brasiliiana
Andracantha sp.
Austrodiplostomum compactum
Bucephalus sp.
Contracaecum sp.
Myxobolus sp.
Piscicolidae gen. sp.
Rhabdochona sp.
Rhabdosynochus hargisi
Trypanorhyncha

Cichlidae

Astronotus ocellatus
Contracaecum sp.
Gussevia asota
Gussevia astronoti
Lamproglena monodi
Placobdella sp.
Polymorphus sp.
Cichla ocellaris
Austrodiplostomum compactum
Gussevia tucunarens
Gussevia undulata
Lamproglena monodi
Procamallanus (Procamallanus) peraccuratus
Proteocephalus macrophallus
Sciadicleithrum ergensi
Geophagus brasiliensis
Austrodiplostomum compactum
Contracaecum sp.
Crassicutis sp.
Diplostomum sp.
Glossiphoniidae gen. sp.
Neascus tipo 1
Neascus tipo 2
Neoechinorhynchus paraguayensis
Placobdella sp.
Polymorphus sp.
Posthodiplostomum macrocotyle
Posthodiplostomum sp.
Sciadicleithrum guanduensis
Tilapia rendalii
Lamproglena monodi

SILURIFORMES

Auchenipteridae

Glanidium melanopterum
Scleroductus sp.
Trachelyopterus striatulus
Austrodiplostomum compactum
Clinostomum detruncatum
Contracaecum sp.
Cucullanus sp.

Helobdella sp.
Hysterothylacium sp.
Paracapillaria piscicola
Posthodiplostomum macrocotyle
Procamallanus (Procamallanus) peraccuratus
Scleroductus sp.

Callichthyidae

Hoplosternum littorale
Capillariidae gen. sp.
Clinostomum complanatum
Glossiphoniidae gen. sp.
Goezia sp.
Henneguya guanduensis
Herpetodiplostomum caimancola
Magnivitellinum corvitellinum
Placobdella sp.

Heptapteridae

Rhamdia quelen
Aphanoblastella mastigatus
Capillariidae gen. sp.
Clinostomum detruncatum
Contracaecum sp.
Cucullanus sp.
Phyllodistomum rhamdiae
Piscicolidae gen. sp.
Polymorphus sp.
Scleroductus sp.

Loricariidae

Hypostomus affinis
Austrodiplostomum compactum
Hyperopletes malmbergi
Paracapillaria piscicola
Phanerothecioides agostinhoi
Placobdella sp.
Trinigyrrus hypostomatis
Loricariichthys castaneus
Austrodiplostomum compactum
Contracaecum sp.
Demidospermus sp.
Helobdella sp.

Pimelodidae

Pimelodus maculatus
Austrodiplostomum compactum
Cucullanus (Cucullanus) pinnai pinnai
Demidospermus armatus
Demidospermus leptosynophallus
Demidospermus majusculus
Demidospermus paravalenciennesi
Demidospermus uncusvalidus
Diplostomum sp.
Helobdella sp.
Myxobolus absonus
Nomimoscolex sp.
Procamallanus sp.
Rhabdochona uruyeni
Scleroductus sp.
Pimelodella sp.
Scleroductus sp.

One of the main steps toward conservation of biodiversity requires systematic inventories and parasites have only recently been included in this evaluation of

biodiversity. In Brazil, only 17.3 % of fish species has its parasite fauna recorded, indicating that the total parasite biodiversity of fishes in the region is grossly underestimated (Luque and Poulin 2007).

The composition of the parasite fauna of fishes from Guandu River is represented mainly by species belonging to the families Dactylogyridae (Monogenea), Diplostomidae (Digenea), Anisakidae, Camallanidae and Cucullanidae (Nematoda). Among the groups of parasites found in this work, monogenea is the group that presented the greatest number of species. *Pimelodus maculatus* was the most parasitized fish species, with 14 species of metazoan parasites and the helminth recorded from the greatest number of hosts was the digenean *A. compactum*. Some genera are clearly specific to South American fishes, whereas others are cosmopolitan and may have been introduced into this River with the translocation of their hosts, since in the last decades the Brazil has shown how the country with largest number of non-native fish introduced into continental waters. The translocation of fish was common in the 60s and 70s, mostly from the Amazonian Basin to the Southeast and Northeast, stimulated by economic reasons, aquaculture, ornamental, sport fishing, biological control or accidental (Buckup and Menezes 2003). This work expanded the geographic distribution and recorded new host for some parasite species, with new records for Brazil.

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LITERATURE CITED

- Abdallah, V.D., R.K. Azevedo and J.L. Luque. 2004. Metazoários Parasitos dos lambaris *Astyanax bimaculatus* (Linnaeus, 1758), *A. paraguayensis* Eigenmann, 1908 e *Oligosarcus hepsetus* (Cuvier, 1829) (Osteichthyes: Characidae), do Rio Guandu, Estado do Rio de Janeiro, Brasil. *Revista Brasileira de Parasitologia Veterinária* 13: 57-63.
- Abdallah, V.D., R.K. Azevedo and J.L. Luque. 2005. Metazoários parasitos do sairé *Cyphocharax gilbert* (Quoy e Gaimard, 1824) (Osteichthyes: Curimatidae), do Rio Guandu, Estado do Rio de Janeiro, Brasil. *Revista Brasileira de Parasitologia Veterinária* 14: 154-159.
- Abdallah, V.D., R.K. Azevedo and J.L. Luque. 2006. Ecologia da comunidade parasitária do tamboatá *Hoplosternum littorale* (Siluriformes: Callichthyidae) do Rio Guandu, Estado do Rio de Janeiro, Brasil. *Acta Scientiarum Biological Sciences* 28: 413-419.
- Abdallah, V.D., R.K. Azevedo and J.L. Luque. 2007. Two new species of *Henneguya* Thélohan, 1892 (Myxozoa, Myxobolidae), parasitic on the gills of *Hoplosternum littorale* (Callichthyidae) and *Cyphocharax gilbert* (Curimatidae) from the Guandu River, State of Rio de Janeiro, Brazil. *Parasitología Latinoamericana* 62: 35-41.
- Abdallah, V.D., R.K. Azevedo and J.L. Luque. 2008. Notes on the morphology of two species of *Gussevía* Kohn e Paperna (Monogenea: Dactylogyridae) parasitic on *Astronotus ocellatus* (Agassiz) (Perciformes: Cichlidae) from Brazil. *Pan-American Journal of Aquatic Sciences* 3: 101-104.
- Abdallah, V.D., R.K. Azevedo and J.L. Luque. 2009. Four new species of *Ligophorus* (Monogenea: Dactylogyridae) parasitic on *Mugil liza* (Actinopterygii: Mugilidae) from Guandu River, Southeastern Brazil. *Journal of Parasitology* 95: 855-864.
- Albuquerque, M.C., M.D. Santos, C.M. Monteiro, A.N. Martins, N.B. Ederli and M.C. Brasil-Sato. 2008. Helminths endoparasitos de *Pimelodus maculatus* Lacépède, 1803, (Actinopterygii, Pimelodidae) de duas localidades (lagoa e calha do rio) do rio Guandu, Estado do Rio de Janeiro, Brasil. *Revista Brasileira de Parasitologia Veterinária* 17: 113-119.
- Amato, S.B. and J.F.R. Amato. 1993. A new species of *Phyllodistomum* Braun, 1899 (Digenea: Gorgoderidae) from *Rhamdia quelen* (Quoy e Gaimard, 1824) (Siluriformes; Pimelodidae). *Memórias do Instituto Oswaldo Cruz* 88: 557-559.
- Amin, O.M. 1987. Key to the families and subfamilies of Acanthocephala, with the erection of a new class (Polyacanthocephala) and a new order (Polyacanthorhynchida). *Journal of Parasitology* 73: 1216-1219.
- Azevedo, R.K., V.D. Abdallah and J.L. Luque. 2006. Ecologia da comunidade de metazoários parasitos do acará *Geophagus brasiliensis* (Perciformes: Cichlidae) do Rio Guandu, Estado do Rio de Janeiro, Brasil. *Acta Scientiarum Biological Sciences* 28: 403-411.
- Azevedo, R.K., V.D. Abdallah and J.L. Luque. 2007. Ecologia da comunidade de metazoários parasitos do apaiari *Astronotus ocellatus* (Cope, 1872) (Perciformes: Cichlidae) do rio Guandu, Estado do Rio de Janeiro, Brasil. *Revista Brasileira de Parasitologia Veterinária* 16: 15-20.
- Boeger, W.A. and R.T. Vianna. 2006. Monogenoidea; p. 42-116 In V.E. Thatcher (ed.). *Amazon Fish Parasites*. Sofia: Pensoft Publishers.
- Boxshall, G.A. and S.H. Halsey. 2004. *An Introduction to Copepod Diversity*. London: The Ray Society. 940 p.
- Buckup, P.A. and A. Menezes. 2009. *Catálogo de peixes marinhos e de água doce do Brasil*. Eletronic Database accessible at <http://www.mnrj.ufrj.br/catalogo>. Museu Nacional, Rio de Janeiro, Brazil. Captured on 16 August 2009.
- Carvalho, A.R., L.E.R. Tavares and J.L. Luque. 2008. A new species of *Sciadicleithrum* (Monogenea, Dactylogyridae) parasitic on *Geophagus brasiliensis* (Perciformes, Cichlidae) from Guandu River, Southeastern Brazil. *Acta Parasitológica* 53:237-239.
- Carvalho, A.R., L.E.R. Tavares and J.L. Luque. 2010a. Variação sazonal dos metazoários parasitos de *Geophagus brasiliensis* (Perciformes: Cichlidae) no rio Guandu, Estado do Rio de Janeiro, Brasil. *Acta Scientiarum*, 32 159-167.
- Carvalho, A.R., R.K. Azevedo, V.D. Abdallah and J.L. Luque. 2010b. Metacercárias de Diplostomidae (Digenea: Diplostomoidea) em *Geophagus brasiliensis* (Perciformes: Cichlidae) do rio Guandu, Estado do Rio de Janeiro, Brasil. *Acta Scientiarum* (in press).
- Davies, R. W. 1991. Annelida: Leeches, Polychaetes and Acanthobdellids. p. 437-479 In J.H. Thorp and A.P. Covich (ed.) *Ecology and Classification of North American Freshwater Invertebrates*. New York: Academic Press.
- Froese, R. and D. Pauly. 2009. *FishBase version (10/2009)*. Electronic database accessible at www.fishbase.org.
- Khalil, L.F., A. Jones and R.A. Bray. 1994. *Key to the cestodes of vertebrates*. Wallingford: CAB International, 751 p.
- Kohn, A., B.M.M. Fernandes and S.C. Cohen. 2007. *South American trematodes parasites of fishes*. Rio de Janeiro: Imprinta Express Ltda, 318p.
- Kritsky, D.C., W.A. Boeger and F. Popazoglo. 1995. Neotropical Monogenoidea. 22. Variation in *Scleroductus* species (Gyrodactylidae) from Siluriform fishes of Southeastern Brazil. *Journal of Helminthological Society of Washington* 62: 53-56.
- Luque, J.L. and R. Poulin. 2007. Metazoan parasite species richness in Neotropical fishes: Hotspots and the geography of biodiversity. *Parasitology* 134: 865-878.
- Mesquita, R.L.B., R.K. Azevedo, V.D. Abdallah and J.L. Luque. 2010. Ectoparasites as numerical dominant species in parasite community of *Trachelyopterus striatulus* (Siluriformes: Auchenipteridae) from Guandu River, southeastern Brazil. *Brazilian Journal of Biology* (in press).
- Moravec, F. 1998. *Nematodes of Freshwater Fishes of the Neotropical Region*. Praga: Academia. 464 p.
- Muniz-Pereira, L.C., F.M. Vieira and J.L. Luque. 2009. Checklist of helminth parasites of threatened vertebrate species from Brazil. *Zootaxa* 2123:1-45.
- Nickol, B.B. and T.N. Padilha. 1979. *Neochinorhynchus paraguayensis* (Acanthocephala: Neochinorhynchidae) from Brazil. *Journal of Parasitology* 65:987-989.
- Padilha, T.N. 1978. Caracterização da família Zonocotylidae com redescritção de *Zonocotyle bicaecata* Travassos, 1948 e descrição de um novo gênero (Trematoda, Digenea). *Revista Brasileira de Biologia* 38: 415-429.
- Poulin, R. and S. Morand. 2004. *Parasite Biodiversity*. Washington: Smithsonian Books, 216 p.
- Santos, M.D., S.R.L.C. Lemos-Pita and M.C. Brasil-Sato. 2007. Fauna de parasitos metazoários de *Pimelodus maculatus* La Cépède, 1803 (Siluriformes, Pimelodidae) do rio Guandu, Estado do Rio de Janeiro, Brasil. *Acta Scientiarum* 29: 101-107.

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